Claims:

(1) A system comprising multiple processing servers, each of which executes one or more programs assigned thereto from among multiple programs for processing one or more steps included in a requested job, and a management server for managing the multiple processing servers;

the management server comprising:

an execution direction generating unit for generating execution direction with identification information of each of the multiple programs and the execution order of the multiple programs; and

an input data sending unit for sending, to a processing server for executing a program to be executed first, input data for the job in association with the execution direction; and

each of the multiple processing servers comprising:

a program executing unit for executing the assigned program with the received input data to update the input data;

a processing server selecting unit for selecting a processing server for executing a program to be executed next with the updated input data, based on the execution direction in association with the input data; and

an input data transferring unit for sending the updated input data in association with the execution direction, to the processing server selected by the processing server selecting unit.

(2) The system according to Claim 1, wherein

the processing server selecting unit inquires of the management server about identification information of a processing server for executing a program to be executed next with the updated input data to select a processing server based on the identification information obtained; and

the management server further comprises:

a processing server information storing unit for storing identification information of each of multiple programs in association with identification information of a processing server for executing the program; and

an inquiry responding unit for, in response to an inquiry from the processing server selecting unit, acquiring identification information of a processing server corresponding to identification information of a program for which the inquiry has been made, from the processing server information storing unit, and sends the identification information of a processing server.

(3) The system according to Claim 2, wherein
each of the multiple processing servers further comprises a caching unit for caching identification information of a processing server which the processing server selecting unit has acquired as a result of inquiry of the inquiry responding unit in the past, in association with identification information on a program to be executed by the processing server; and
the processing server selecting unit selects, on condition that identification information of a program to be executed is cached by the caching unit, a processing server corresponding to the program.

(4) The system according to Claim 2, wherein
in response to receiving the input data, the program executing unit sends a receiving notification indicating that input data has been received to the management server, and in response to terminating execution of the program, the program executing unit sends an termination notification indicating that execution of the program has been terminated;
the processing server information storing unit stores excutability information based on the receiving notification and the termination notification on whether or not it is possible for each of the multiple processing server to newly receive input data and execute a program; and
the inquiry responding unit selects, from among multiple processing servers for executing a program for which an inquiry has been made, a processing server capable of newly receiving input data and executing the program based on the executability information to send identification information of the selected processing server.

(5) The system according to Claim 4, wherein
     the management server further comprises a program activating
     unit for, on condition that processing servers more than a
     predetermined reference rate among the multiple processing
     servers for executing the program for which the inquiry
     responding unit has received an inquiry, are not capable of
     newly receiving input data and executing the program, activating
     the program on any of processing servers which have not activated
     the program yet; and
     the inquiry responding unit sends identification information
     of the processing server on which the program has been activated
     by the program activating unit.

(6) The system according to Claim 1, wherein
     each of the multiple processing servers comprises:
     a history storing unit for storing history of input data and
     execution direction sent by the input data transferring unit
     to the processing server; and
     a fault occurrence determining unit for determining whether
     or not any fault has occurred in execution of a program on a
     sending-destination processing server to which the input data
     transferring unit has sent the updated input data and execution
     direction; and
     in response to determining that a fault has occurred by the
     fault occurrence determining unit,
     the processing server selecting unit selects a different
     processing server for executing a program to be executed next;
     and
     the input data transferring unit acquires input data and
     execution direction from the history storing unit to send the
     input data and the execution direction to the different
     processing server selected by the processing server selecting
     unit.

(7) The system according to Claim 6, wherein
     in response to receiving the input data, the program executing
     unit sends a receiving notification indicating that input data
     has been received to the management server, in response to

terminating execution of the program, the program executing unit sends an termination notification indicating that execution of the program has been terminated;

the management server further comprises a fault occurrence notification sending unit for, if the receiving notification is received from any processing server and, after that, the termination notification is not received within a predetermined reference processing time from the processing server, sending a fault occurrence notification indicating that a fault has occurred in execution of a program on the processing server to a sending-source processing server which has sent input data to the processing server; and

the fault occurrence determining unit determines, if receiving the fault occurrence notification, that a fault has occurred in execution of a program on a sending-destination processing server to which the input data transferring unit has sent the updated input data and the execution direction.

(8) The system according to Claim 6, wherein

in response to receiving input data and execution direction by a sending-destination processing server,

on condition that newly receiving input data and determining that it is impossible to execute a program, the program executing unit sends a refusal notification indicating refusal of input data to a sending-source processing server which has sent the input data and the execution direction; and

in reponse to receiving the refusal notification from the sending-destination processing server, the fault occurrence determining unit of the sending-source processing server determines that a fault has occurred in execution of a program on the sending-destination processing server.

(9) The system according to Claim 6, wherein

the management server further comprises a deletion directing unit for, on condition that the job is completed by execution of the multiple programs, causing input data and execution direction to be deleted from the history storing section of each of the multiple processing server.

(10) The system according to Claim 6, wherein
the processing server selecting unit of each of the multiple
processing servers selects, from among multiple processing
servers activating a program to be executed next with the updated
input data, a processing server which communicates with the
processing server with a higher communication speed as the
different processing server in preference to a server with a
lower communication speed.

(11) The system according to Claim 1, wherein
each of the multiple processing servers further comprises:
a history storing unit for storing history information on data
on the processing server which the program executing unit has
changed by executing the program, in association with
information which enables restoration to the state before the
change; and
a change restoring unit for, if a fault has occurred in execution
of a program on a sending-destination processing server to which
the input data transferring unit has sent the updated input
data and execution direction, restoring data changed by the
program executing unit to the original state based on the history
information in the history storing unit.

(12) The system according to Claim 1, wherein
the management server further comprises a program activating
unit for detecting each of programs to be executed for and after
the second time with the input data to be inputted in the job
as input, based on the generated execution direction, and
activating each of the detected programs on any processing server
different from the sending-destination server of the input data
sending unit.

(13) The system according to Claim 12, wherein
the program executing unit of each of the multiple processing
servers notifies the management server of throughput required
for execution of a program in the past; and
the program activating unit of the management server activates,
on condition that the past throughput of a program notified
by the program executing unit exceeds the maximum throughput

to be processed by a processing server already activating the program, the program on any processing server different from the sending-destination server of the input data sending unit.

(14) The system according to Claim 1, wherein
the management server further comprises a program activating unit for detecting each of programs to be executed with the input data to be inputted in the job as input, and, for each of the detected programs, on condition that throughput required for the program to be executed with the input data exceeds the maximum throughput to be processed by that a processing server already activating the program, activates the program on any processing server different from the sending-destination server of the input data sending unit.

(15) The system according to Claim 1, wherein
on condition that the program executing unit does not receive input data and execution direction within a predetermined reference waiting time after receiving input data and execution direction last, the program executing unit stops execution of a program by the processing server.

(16) The system according to Claim 1, wherein
the management server further comprises a processing server changing unit for, on condition that the usage rate of computation resources to be used for execution of a program by the program executing unit is below a predetermined reference usage rate, causing a different processing server with a less maximum throughput than the processing server to execute the program.

(17) The system according to Claim 1, wherein
in response to receiving input data and execution direction by a sending-destination processing server,
the program executing unit detects that there still exists a program which should have been already executed based on received execution direction, and executes the detected program on condition that it is possible for the sending-source processing server to execute the program.

(18) The system according to Claim 1, wherein

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the input data transferring unit of each of the multiple processing servers creates a digital signature of the updated input data or the execution information to send the created digital signature in association with the input data and execution direction to be covered by the digital sign; and the program executing unit of a processing server executes a program on condition that the digital signature is correctly verified.

(19) A management server for managing multiple processing servers, each of which executes one or more program assigned thereto from among multiple programs for processing one or more steps included in a requested job;

each of the multiple processing servers comprising:

a program executing unit for, by executing the assigned program with received input data, updating the input data;

a processing server selecting unit for selecting a different processing server for executing a program to be executed next with the updated input data, based on the execution direction received in association with the input data; and

an input data transferring unit for sending the updated input data in association with the execution direction, to the processing server selected by the processing server selecting unit; and

the management server comprising:

an execution direction generating unit for generating execution direction with identification information of each of the multiple programs and the execution order of the multiple programs; and

an input data sending unit for sending, to a processing server for executing a program to be executed first, input data for the job in association with the execution direction.

(20) A processing server managed by a management server, the processing server executing one or more program assigned thereto from among multiple programs for processing one or more steps included in a requested job;

the management server comprising:

an execution direction generating unit for generating execution direction with identification information of each of the multiple programs and the execution order of the multiple programs; and

an input data sending unit for sending, to a processing server for executing a program to be executed first, input data for the job in association with the execution direction; and the processing server comprising:

a program executing unit for executing the assigned program with the received input data to update the input data;

a processing server selecting unit for selecting another processing server for executing a program to be executed next with the updated input data, based on the execution direction in association with the input data; and

an input data transferring unit for sending the updated input data in association with the execution direction, to the processing server selected by the processing server selecting unit.

(21) A control method for controlling a management server; the management server managing multiple processing servers, each of which executes one or more program assigned thereto from among multiple programs for processing one or more steps included in a requested job;

each of the multiple processing servers comprising:

a program executing unit for executing the assigned program with the received input data to update the input data;

a processing server selecting unit for selecting another processing server for executing a program to be executed next with the updated input data, based on the execution direction in association with the input data; and

an input data transferring unit for sending the updated input data in association with the execution direction, to the processing server selected by the processing server selecting unit; and

the method comprising the steps of:

generating execution direction with identification information

of each of the multiple programs and the execution order of the multiple programs; and

sending, to a processing server for executing a program to be executed first, input data for the job in association with the execution direction.

(22) A control method for controlling a processing server managed by a management server; the processing server executing one or more program assigned thereto from among multiple programs for processing one or more steps included in a requested job; the management server comprising:

an execution direction generating unit for generating execution direction with identification information of each of the multiple programs and the execution order of the multiple programs; and

an input data sending unit for sending, to a processing server for executing a program to be executed first, input data for the job in association with the execution direction;

the method comprising the steps of:

executing the assigned program with the received input data to update the input data;

selecting another processing server for executing a program to be executed next with the updated input data, based on the execution direction in association with the input data; and

sending the updated input data in association with the execution direction, to the processing server selected at the processing server selecting step.

(23) A control program for causing a computer to function as a management server; the management server managing multiple processing servers, each of which executes one or more program assigned thereto from among multiple programs for processing one or more steps included in a requested job;

each of the multiple processing servers comprising:

a program executing unit for executing the assigned program with the received input data to update the input data;

a processing server selecting unit for selecting another processing server for executing a program to be executed next

with the updated input data, based on the execution direction
in association with the input data; and
an input data transferring unit for sending the updated input
data in association with the execution direction, to the
processing server selected by the processing server selecting
unit; and
the program causing the computer to function as:
an execution direction generating unit for generating execution
direction with identification information of each of the
multiple programs and the execution order of the multiple
programs; and
an input data sending unit for sending, to a processing server
for executing a program to be executed first, input data for
the job in association with the execution direction.

(24) A control program for causing a computer to function as a
processing server managed by a management server, the processing
server executing one or more program assigned thereto from among
multiple programs for processing one or more steps included
in a requested job;
the management server comprising:
an execution direction generating unit for generating execution
direction with identification information of each of the
multiple programs and the execution order of the multiple
programs; and
an input data sending unit for sending, to a processing server
for executing a program to be executed first, input data for
the job in association with the execution direction; and
the program causing the computer to function as:
a program executing unit for executing the assigned program
with the received input data to update the input data;
a processing server selecting unit for selecting another
processing server for executing a program to be executed next
with the updated input data, based on the execution direction
in association with the input data; and
an input data transferring unit for sending the updated input
data in association with the execution direction, to the

processing server selected by the processing server selecting unit.

(25) A recording medium on which the control program according to Claim 23 or 24 is recorded.